JOURNAL

OF THE

New York Entomological Society.

Vol. VI. SEPTEMBER, 1898. No. 3.

THE LIFE HISTORIES OF THE NEW YORK SLUG-CATERPILLARS.—XVI, WITH CERTAIN ADDITIONS AND CORRECTIONS.

PLATE VIII.

By Harrison G. Dyar, A.M., Ph.D.

Tortricidia testacea *Packard.*

1864—*Tortricidia testacea* Packard, Proc. Ent. Soc. Phil. III, 337.
1882— " " Grote, Check List, Bombyces, no. 195.
1891— " " Smith, List. Lep. no. 1211.
1892— " " Kirby, Cat. Lep. Het. I, 551.
1894— " " Neumoegen & Dyar, Journ. N. Y. Ent. Soc. II,

Special Structural Characters.

Dorsal space moderately broad, narrowing only a little toward the extremities, arched; lateral space broad, oblique, concave; subventral space small, retracted. Ridges slightly prominent, never tubercular, furnished with single or furcate swollen-tipped setæ in stage I, afterward with rudimentary setæ which nearly disappear at maturity. Outline from dorsal aspect elliptical, notched at the anterior part of joint 13 to form a short quadrate tail. Skin covered with close, appressed, rather large, clear granules, which appear immediately after first molt, a little papillose on the margins, becoming smoother and increasing in number at subsequent molts. Depressed spaces large, well developed, deep, with sharp sides, the bottom flat and finely granulated. The spaces (1) to (8) are present, dividing the surface into a series of raised latticed ridges.

The larva is throughout very smooth. The coloration is green with a large red mark appearing in the middle of the back, finally reaching head and tail and the middle of the sides.

This species is more generalized than its ally, *T. pallida*. It is the stem form, from which *pallida* is just beginning to diverge. It is the more northern form of the two and in this again shows its ancestral condition, since, belonging to the Palæarctic Eucleids, it is less distantly removed from the ancient habitat of the group.

AFFINITIES, HABITS, ETC.

This larva is closely allied to *T. pallida*. It has all the same structure and coloration, differing only in certain details which might be considered to be of but varietal rank, except that they prove to be constant. The certain differentiation of these larvæ is difficult except when the whole life history is seen, and then a number of differences appear. The real difference between the species is found in the date of occurrence. The moths of *testacea* emerge unusually early, nearly a month before the allied species. My dates are June 10th to 14th for moths bred at Long Island. Professor G. H. Hudson finds June 9th to 22d for all the moths he has taken at light at Plattsburgh during a series of years. Consequently, full grown larvæ are found early, often during July at the time when *T. pallida* is hatching. This is not a case of two differently colored broods, as I thought at one time. Both species are strictly single brooded, like all the other northern Eucleids. The power of early emergence gives *T. testacea* a northern range, since it pupates in time to avoid early frosts. In the Adirondacks it was the only Eucleid met with.

The larva is a rather low feeder, occurring in the same situations as its ally, *T. pallida*. The habits are the same. There are seven larval stages, occasionally six by the omission of stage II and still more rarely eight by the interpolation of an extra stage before the last, as Mr. L. H. Joutel tells me happened to a larva that I sent him to breed.

CRITICISM OF PREVIOUS DESCRIPTIONS.

I have no references to this larva as such. Probably the descriptions referred to *T. pallida* cover *testacea* in part, but I find it difficult to sort them out without dates of occurrence. The diagnosis given by Miss Morton and myself (JOURNAL N. Y. ENT. SOC., III, 146) of (?) *T. testacea* refers more probably to *Kronæa minuta* Reakirt. Miss Morton thought she had bred the larva, getting an imago *testacea*, but there must have been some error. I followed her opinion at the time of writing the synopsis as I had not then bred *testacea* myself. A corrected table will be given at the end of these articles. My account of *T. pal-*

lida (JOURNAL N. Y. ENT. SOC., IV, 167–172) contains many sentences referring to *T. testacea*. Having wrongly identified the larva of *testacea* and being under a misapprehension as to the close relation of several of our smooth red-spotted Eucleids and further desirous of including all the varieties of *pallida* while I was writing about it, I went too far and included portions taken from larvæ of other species. The account, therefore, is based on *Tortricidia pallida*, *T. testacea* and *T.* (*Heterogenea**) *flexuosa*, confused together. It is fully corrected herewith, with illustrations of both species.

DESCRIPTION OF THE SEVERAL STAGES IN DETAIL.

Egg. Elliptical, flat, whitish translucent on white leaves, shining; reticulations faint, narrowly linear, elongate. Size 1.0 × .6 mm. Laid singly on the under side of the leaf.

Stage I. (Plate VIII, fig. 1). Elliptical, rather elongate, dorsal and lateral spaces rather broad. Setæ as in *T. pallida*, the Y-shaped ones large, strongly alternating, those on joints 5, 7, 9 and 11 leaving out. Color translucent whitish with a slight green tint. Skin smooth. Length .7–1.1 mm. The larva feeds during this stage.

Stage II. Distinct short black setæ, two on subdorsal ridge, one on lateral ridge on the abdominal segments. Subdorsal ridge rather square, dorsum flat, rounded; tail quadrate; sides concave. Lateral ridge moderate, subventral space small, retracted. Depressed spaces all present as in the mature larva, deep, sharp, the latticed ridges composed of one row of large clear granules, becoming subpapillose on the lateral ridge. Color pale greenish without marks. Length, 1.1–1.7 mm., or reaching 2.2 mm. in six-stage larvæ.

Stage III. Elliptical, tail rounded quadrate; all pale green. Skin structures the same as before; setæ quite distinct. Length, 1.6–2.2 mm. Six-stage larvæ, which have omitted stage II, have the size and coloration of the next stage.

Stage IV. (Plate VIII, figs. 2, 3). Elliptical, both ends rounded, the anterior more obtusely; dorsum arched. Ridges low, the subdorsal shorter than the lateral. Body smooth, setæ nearly obsolete. Skin coarsely clear-granular except in the large depressed spaces which are finely granular and on the lateral ridge where the granules become subpapillose. Color light yellowish green; during the stage the subdorsal

*I find that none of the American species belong to *Heterogenea* Knoch except *shurtleffii* Pack. which is distinct from *cæsonia* Grt. A generic revision will follow.

ridge becomes pale, a large rounded quadrate reddish spot appears dorsally, covering joints 7 to 9 and reaches the subdorsal ridge; as the stage advances this becomes better defined, regularly elliptical, covering joints 6 to 10 and reaching nearly half way down the lateral space. It is bordered with yellow, this color extending also backward and forward for some distance along the subdorsal ridge (Plate VIII, fig. 3). Length, 2.2 to 3.3 mm.

Stage V. (Plate VIII, fig. 4). Shape as before. Skin surface the same, but the granules on the latticed ridges are more numerous. Setæ obsolete, scarcely discernible except at the ends of the body. Color green, dorsal patch elliptical, but now a little angled at the sides, a slight point projected to the depressed space (4) of joints 6–7 and 9–10 and a more decided one reaching below the space (4) on joint 8. The patch is rounded before and behind and contains a varying paler central space, which may be so large as to reduce the patch to a red line but is usually small and quadrate. Yellow border distinct, reaching as a subdorsal line nearly to head and tail. Depressed spaces greenish. Length, 3.5 to 4.7 mm.

Stage VI (Plate VIII, fig. 5). Structure as in the mature larva and as before. Color green, the depressed spaces concolorous. A large red patch of varying shade covers the center of the back, more rounded out and larger than before and enclosing six of depressed spaces (1). Its outline is elliptical, a little irregular or notched on the sides, the furthest lateral extension being on joint 8 where it reaches depressed space (5). The patch does not reach either extremity, though a small detached red spot may occur on joint 3. There is a more or less distinct central, square, pale blotch on joints 7, 8, sometimes large as before. A single example found on hickory had the patch blackish chocolate, narrowly bordered with red and yellow. Length, 4.7 to 6.7 mm.

Stage VII.—(JOURN. N. Y. ENT. SOC., IV, pl. VI, figs. 5, 6, 7) shape as described. Depressed spaces as in *T. pallida* (l. c. pl. VI, f. 8). Latticed ridges coarsely clear granular, the depressed spaces finely granular. Color green, depressed spaces pale with dark centers. Dorsal mark reaching the extremities and lateral margins in the form of a cross with four projections from the center which touch the depressed spaces (4) of joints 6–7 and 9–10 (l. c. pl. VI, f. 6), or filled out to a larger diamond-shaped mark, produced narrowly forward to joint 3 (l. c. pl. VI, f. 7). It has a pale salmon-colored center, often square and covering only one depressed space (joints 7–8) or rarely larger, occasionally wanting. The patch is bordered with crimson and yellow

and is usually darker around the edge and on the latticed ridges. The exact shape is variable, but the points mentioned form its boundaries between which the outline may be contracted or expanded. Length, 6.7 to 9.5 mm.

Cocoon with the characters of the group.

Food-plants: Oak, wild cherry, birch, hickory, chestnut, witch-hazel and sour gum have been observed.

ADDITIONS AND CORRECTIONS.

As it was necessary to make the corrections to the account of *T. pallida* with this plate, I have included all additions and corrections that have occurred to me to date, to all the articles that I have published on Eucleid larvæ in this JOURNAL. Corrections to the introductory article will be deferred to the concluding remarks.

Apoda y-inversa *Packard.*

This JOURNAL, III, p. 151. Omit the reference to the larva. *A. y-inversa* larva was undescribed previous to our article.

This JOURNAL, III, p. 152, lines 8, 9. Omit the words "in which the larva does not feed." P. 154, *Stage I.*—Add "The larvæ feed in this stage. Length, .9 to 1.5 mm. Subdorsal setæ of joints 5, 7, 9 and 11 lean outward, lateral of joint 5 leans upward."

This JOURNAL, III, Plate VI, Fig. 1. The alternation of the setæ is wrongly represented.

Sibine stimulea *Clemens.*

Comparison may be made with the allied South American species referred to by me (Can. Ent., XXIX, 77).

Tortricidia pallida *Herrich-Schäffer.*

This JOURNAL, IV, 167, et seq. *Special structural characters*, line 5 of paragraph, omit the words "smooth or;" p. 168 line 10 for "setæ practically" read "tubercles."

Affinities, Habits, etc. Read as follows: This larva is typical of the red-marked smooth Eucleids, a subdivision of the Palæarctic group. It is most nearly allied to *T. testacea*, less closely to *H. flexuosa*. It represents a more primitive state than *Apoda* in that setæ i*a* and i*b* on joint 4 and i and ii on joints 5 to 12 are partly united into a furcate or Y-shaped spine, both limbs of equal length, whereas in *Apoda* one limb has been reduced to a slight prominence.

The moths emerge rather late in the season. Professor G. H. Hudson has taken them at light between June 26th and July 29th at Plattsburgh during several years. My own dates for bred moths are July 8th to 19th.

Full grown larvæ are not found till September. In Long Island, eggs and young larvæ were found on the trees at the time the larvæ of *T. testacea* were maturing.

This larva is a little more specialized than *T. testacea*, in that the dorsal patch becomes earlier defined and grows larger while the granules are a little more papillose. The two larvæ, however, are not distinguishable in any strong character.

The larva is rather a low feeder, occurring on higher bushes and the lower branches of trees, along the edges of woods, etc., not as a rule in very shaded locations. Rarely more than one larva is found on the same plant. They are well scattered, not affecting any particular tree and occurring almost everywhere, not abundant locally and elsewhere rare as *H. flexuosa* is. The larva remains on the back of the leaf where its shape and color are adapted to its concealment.

Criticism of Previous Descriptions. The "*T. testacea*" that Dr. Packard described from a larva I sent him, may be correctly named. The date of occurrence would decide.

Description of the Several Stages in Detail. Stage I.—Add: Setæ large, strongly alternating, those on joints 5, 7, 9 and 11 leaning outward.

Stage II.—Read: Elliptical, narrowed behind, tail quadrate. Subdorsal ridge rather square, dorsum flat, rounded; sides concave. Lateral ridge moderate; subventral space small, retracted. Setæ short, distinct, pointed, black, two on subdorsal ridge, one on lateral ridge on abdomen. Depressed spaces large, sharply edged, deep, as in the mature larva. Latticed ridges apparently one granule wide, but not smooth and clear, being all finely papillose, especially on the lateral ridge, though also showing on the subdorsal ridge, feathery and frosted. Color frosted whitish, no marks. Length, 1 to 1.6 mm.

Stage III.—Read: Elliptical, tail rounded quadrate, structure as before. Setæ still distinct, short, black. Skin neatly granular as in *T. testacea*, papillose only around the margin. Colorless, greenish, a faint red shade centrally on the subdorsal ridges. Later this develops into a large red patch, becoming rounded, the depressed spaces covered by it pale. Length, 1.6 to 2.5 mm.

Stage IV.—(Plate VIII, fig. 8). Elliptical, both ends rounded, the

anterior more obtusely; dorsum arched, the highest point a little before the middle; tail quadrate. Ridges low, not prominent, the subventral shorter than the lateral. Body smooth, setæ still visible. Depressed spaces large, the latticed ridges beginning to be more than one granule wide, those of the subventral ridge subpapillose or slightly cleft. Color whitish, green only in front; dorsal red patch large, covering joints 6 to 10, pentagonal, truncate before, widest at joint 8 where it reaches the lower border of the depressed space (4), tapering behind nearly to a point; a central pale patch and distinct yellow border, produced as a subdorsal line behind, but not in front. Length, 2.6 to 3.7 mm.

Stage V.—(Plate VIII, fig. 9). Page 170, lines 31, 32, 39, 40 and page 171 lines 1 and 2, omit all reference to the coloration and read: green in front, the dorsal patch larger than before, more distinctly angled and pointed in front; it covers six depressed spaces and reaches on the sides to depressed space (5). There may be a small red patch on joint 3.

Stage VI.—(Plate VIII, fig. 10). Page 171, lines 8 to 13, omit all referring to the coloration and read: A large dorsal purplish red patch almost exactly as in the mature larva, but not reaching either extremity. Line 7 for "may have" read "has."

Stage VIII.—(Plate VIII, fig. 11). Page 171, lines 27 and 28, omit the words "from narrow to broad and." Omit also the references to the plate and the foot-note at bottom of page. Lines 36 and 37, omit "thus forming a large blurred red cross." There is no particular resemblance to a cross in *T. pallida.*

This JOURNAL, IV, pl. VI, figs. 5, 6 and 7 represent *T. testacea* not *T. pallida.* Compare the accompanying plate (Plate VIII, figs 8, 10 and 11) for the correct representation of *T. pallida.* Figs. 3 and 4 represent *H. flexuosa* not *T. pallida.*

Phobetron pithecium *Abbot & Smith.*

This JOURNAL, IV, 178. Add as reference to the larva, 1869—Melsheimer, Harris' Ent. Corresp., p. 112 (as *Oiketicus*).

Sisyrosea textula *Herrich-Schäffer.*

This JOURNAL, IV, 187. Add the following description of the freshly laid egg: Large, colorless, a little milky whitish, shining; 1.8 × 41. mm. and almost without thickness (about .1 mm.); reticulations distinct, raised, whiter than the egg. Hatches in not less than ten days.

Stage I.—Mr. Joutel has seen this stage with the subdorsal horns of joints 6 to 12 degenerate, the rest normal. The degenerate horns had

three large, and a group of smaller setæ on joints 6 and 12, three large and other very rudimentary ones on joints 5 to 11. This is a most interesting variation as foreshadowing the condition of the more specialized species where but three setæ remain.

EXPLANATION OF PLATE VIII.

Tortricidia testacea.

Fig. 1. Larva, stage I, dorsal view, enlarged.
" 2. Larva, stage IV, dorsal view, early in the stage.
" 3. The same, later in the stage.
" 4. Larva end of stage V.
" 5. Larva end of stage VI.
" 6. *T. testacea*, imago.

Tortricidia pallida.

Fig. 7. Side view of mature larva.
" 8. Larva end of stage IV (compare fig. 2).
" 9. Larva end of stage V (compare fig. 4).
" 10. Larva end of stage VI (compare fig. 5).
" 11. Larva stage VII (compare this JOURNAL, IV, pl. VI, figs. 6 and 7).

LIFE-HISTORY OF CALYBIA SLOSSONIÆ.

BY HARRISON G. DYAR.

I am able to present descriptions of the remaining stages of this larva which, with those previously given by me, will complete the life-history. The previous article may be amended as follows:

This JOURNAL, V, p. 123, line 1, read . . appendages of nearly equal length at maturity, the anterior ones a little shorter, but in stages II and III of unequal length as in *Phobetron*. Page 124, line 1 for "except that this character may not be primary," read: except that this character is a secondary adaptation.

Add: I have recently received a specimen of this species from Mr. Graef labeled "Texas."

DESCRIPTION OF THE SEVERAL STAGES IN DETAIL.

Egg.—Add: duration of this stage six days; 15 days in a cold room in New York.